Effects of Body Position on Facial Recognition in Police Body-Worn Cameras

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Background

- Body-worn cameras (BWCs) are a popular tool in law enforcement, but also controversial
- Have video and audio recording capability
- Primarily used by law enforcement agencies in the United States for officer accountability¹
- Successful implementation of facial recognition in BWCs could enhance officer safety
- CEO of Axon (leading BWC manufacturer): facial recognition not yet accurate enough for BWCs²
- Amazon has tested BWC facial recognition in at least two U.S. cities despite known inaccuracies³

Problem: Facial recognition works well in controlled conditions with stationary cameras, but police officers work in uncontrolled conditions with non-stationary cameras; officer body position may negatively impact accuracy.

Research Questions

1. Does a BWC wearer’s trunk movement in the transverse plane (clockwise and counter-clockwise rotation from the hips) affect the target’s match score?
2. Does a BWC wearer’s trunk movement in the sagittal plane (flexion and extension from the hips) affect the target’s match score?
3. Does a BWC wearer’s trunk movement in the coronal plane (flexion and extension of the knees) affect the target’s match score?

Proposed Evaluation

- Phase 1: Collection of qualitative data with Lafayette Police Department (LPD) officers regarding experiences, preferences in BWC use
- Phase 2: Collection of quantitative data on how variations in LPD officers’ body positions affect facial recognition accuracy for a stationary target

- Equipment:
  - Microsoft Kinect v2 (kinetic capture system)
  - Axon Body 2 BWC
  - Digital video camera to record scene
  - Neurotechnology facial recognition software

- Participants:
  - BWC wearers: Right-handed LPD officers (target N = 35) in patrol uniform, including protective vest, duty belt; interview stance
  - BWC target: Caucasian male, no facial hair, identity known to system; stationary

- Experimental setup (LPD tactics room):

  - Method:
    - Manipulate, measure changes in common policing stance (interview stance)
    - Evaluate positional effects on accuracy of a known facial recognition target

References